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NRO Review
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13 January 1972

MEMORANDUM FOR: Deputy Director of Research and Development

THROUGH: Chief/Biological Sciences Division/ORD

SUBJECT: Real-Time Multisensor Information Processing,
Cheque Review

    1. I feel the subject proposed R&D is certainly relevant to the
EOI program but should not be dependent on it. I am aware of political
pros and cons for a close association.

    2. The EOI program seems to me to primarily hold a require-
ment for a general human factors participation in systems development
with appropriate R&D at required points rather than essentially ORD
research support in the area of real-time multisensor information
processing.

    3. I firmly believe in the potential value of human factors input
to the EOI program and will not reiterate the items listed in Dick's
memo |＿＿＿＿＿＿| 12 January 1972). However, in regard to the
broad Agency impact I feel consideration should be given to the follow-
ing:

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      a. Due to inherent organizational inertia and personnel
tendency to maintain the status-quo, there may be a tendency
to down-play the significance of the new tool and adopt a
"business as usual" attitude. That is, asking the question of how
the EOI can best serve the present intelligence system with
a minimum of disruption as opposed to the question of how
should we structure and modify our current system to obtain
maximum benefit from the EOI? The situation would be analogous
to an expert 35mm photographer suddenly being presented with
an excellent 16mm movie camera and continuing to produce
"stop" photos of everything in sight.

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b.   There are two schools of thought regarding the
urgency of the real-time aspects of the system.   On the
one hand, it is felt that the data delivered will be in near
real-time.   (This does not routinely require real-time
decision making.)   Therefore, our current procedures
for intelligence data analysis are adequate.   On the other
hand, there will be times when we "catch" a crucial inter-
national event in development (or arms deployment) and
real-time decision making, without the luxury of concensus
opinion, will be a reality.   Of course, both points of view
are correct and must be considered, but neither in isola-
tion should dictate the course of system development.

c.   Unless disturbed by the Harvard Business School,
an organization naturally evolves into functional specialty com-
ponents.   Perhaps in the case of the EOI, it cannot best respond
to functional requirements.   If ORD were suddenly presented
with an omnipotent scope which could sequentially look at
world-wide VIP's, biological organisms, computer processing
systems, microminiaturized electronic developments, and
denied chemical processing systems, there would be considerable
discussion as to the procedures for use of this hypothetical scope.
It should not be necessary to completely disband the ORD functional
organization for the sake of a new and important tool, but the
system designer would have to think in completely new terms and
concepts if the scope were to achieve maximum benefit for the
total community goals as opposed to democratic sharing between
competing user requirements.   The above analogy applies not
only to target selection but also to data storage, retrieval, and
information exchange between various components of the total
analysis community.   Without waiting to "fit the system to what
we have," this problem could be modeled at the present time, with
assistance of several disciplines, and hopefully arrive at alterna-
tive concepts for EOI introduction into the system or at least
provide data from which management could make rational decisions.

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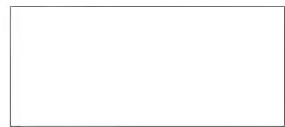
d.   Along more specific lines, it has been indicated
that the crucial human factors problem associated with EOI
is real-time data interpretation and that this is being accom-
plished by NPIC.   I grant that this problem is important
but not any more so than some of those indicated above.
Further, assuming NPIC is accomplishing the experimental
work relating image interpretation validity to systematic
variation of brightness, contrast, image enhancement techni-
ques, number of lines, sweep rate, etc., I feel it is equally
important to evaluate human decision making validity in real-
time, even assuming the image has fidelity equal to that of
the eyeball at optimum target distance.   This is a psycho-
logical cognitive problem and not limited to the psychophysics
of hardware display and subject image detection.

4.   As indicated above, I feel the multisensor real-time information
processing problem is highly significant apart from its relationship to
human factors participation in the EOI system.   I've written up these
concepts previously for prior program planning purposes and will not
elaborate at this point.   In brief, the general research areas are as   25X1
follows:

b.   Our finished intelligence statements are generally based
upon a considered evaluative judgment derived from varied
specialized technical, mechanical, and human sources.   Frequently,
the decision is a concensus of expert opinion and judgment in
different areas.   I am not aware of a better system to provide valid
intelligence if circumstances permit.   However, we are reaching

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a point in real-time data presentation, data storage systems, and pin-point world-wide communication and sensing systems that we will be smothered in raw data, without time for diverse technical evaluative input, and forced to make real-time crucial decisions. By analogy, a surgeon in deciding upon the necessity of a hazardous operation, if the patient's condition permits, may reach his decision on the basis of extensive physiological tests and indices as well as the consultive contributions of innumerable medical and allied specialists. This is as it should be. However, in certain crucial situations, the surgeon must make a life or death decision on the basis of his best judgment and the information immediately available. For the reasons mentioned previously, we will face an increasing number of crucial intelligence decisions which must be made immediately without recourse to our routine system of data collection analysis and evaluation. There is practically no information available concerning the validity of intelligence decision making under controlled temporal limitation and data input. Such studies in real-time decision making would seem to be an essential requirement.

c. Aside from the decision validity problem of real-time data presentation, there is the related problem of information processing of real-time data. For instance, we have very limited information concerning human ability to operate and navigate a remote vehicle via real-time data input. Very limited information is available concerning remote guidance capability for the Condor, Maverick, and other missile systems under relatively short range conditions. The ground based operators of the Russian LUNOKHOD I moon exploration vehicle were trained for two and a half years in the control of the vehicle on the basis of real-time data. We should not wait for another _____ to expediously "best guess" as to human capability for real-time data processing capability. The application of such information in the intelligence community is much broader than the control of a remote vehicle, either on the moon, in the air, or under the sea. We should have experimental data on man's real-time data processing capabilities for not merely control of vehicles but also for processing concepts, raw data and ideas as presented in various formats, and systematically controlled rates.
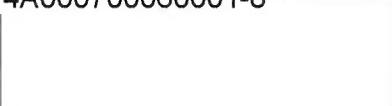
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Crucial Agency functions will in the near future require such
information if we are to recruit and train appropriate personnel
for selected real-time data analysis tasks on a basis more
efficient than trial and error.

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